

Claims

1. A method for improving in a multi-layer packet switching network or system quality of service (QoS) scheduling having a rate-conserving scheduling functionality based on two scheduling layers operating on two granularities in protocol data units (PDU) of at least one incoming data flow, the method comprising the steps of:
 - maintaining QoS requirements and determining a service order for the protocol data units by an upper scheduling layer,
 - implementing packet switching based on constraints by a lower scheduler layer,
 - selecting service ordered protocol data units on demand by the lower scheduling layer in dependence on these constraints for efficiently allocating timeslots for the data flows, and
 - serving the selected protocol data units by the lower scheduling layer.
2. The method of claim 1, further comprising the steps of:
 - monitoring an achieved data throughput by the lower scheduling layer, and
 - deducting a scheduling order in dependence of the monitored data throughput.
3. The method of claim 1 further comprising the steps of:
 - strictly serving the protocol data units in dependence on definable precedence classes based on system constraints related to the protocol data units and/or the step of
 - defining at least one precedence semantics according to which protocol data units of different precedence classes are served.
4. The method of claim 1 further comprising the step of:
 - giving selectable protocol data units preferential service.
5. The method of claim 4 wherein the selectable protocol data units are of a real-time application
6. The method of claim 4 wherein the selectable protocol data units are of signalling traffic

7. The method of any of claim 1 further comprising the step of:
scheduling in the lower scheduling layer one selected protocol data unit
from each data flow after another, or the step of:
- 5 scheduling in the lower scheduling layer the protocol data units from one
selected data flow prior to the scheduling of the protocol data units from an
other selected data flow.
8. The method of claim 1 further comprising the steps of:
- 10 defining in dependence on system constraints precedence classes, and
providing for each precedence class a respective service order of
selected protocol data units.
9. The method of claim 1 further comprising the step of:
- 15 ordering the protocol data units respectively in dependence on timeslot
allocation constraints.
10. A transceiver in a multi-layer packet switching network or system comprising:
at least a first and second scheduling means each of which is operating
20 on a different granularity in protocol data units of at least one incoming data
flow,
wherein an upper layer scheduling means comprises means for
maintaining QoS requirements and for determining a service order for the
protocol data units, and
- 25 wherein a lower layer scheduling means comprises means for
implementing packet switching based system constraints,
means for selecting service ordered protocol data units in dependence on
these constraints for efficiently allocating timeslots for the data flows, and
means for serving the selected protocol data units.
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11. A computer readable medium storing computer program instructions which are
executable on a computer system in a multi-layer packet switching network or
system, the computer instructions defining the steps of:
- 35 maintaining QoS requirements and determining a service order for the
protocol data units by an upper scheduling layer,
implementing packet switching based on constraints by a lower scheduler

layer,

selecting service ordered protocol data units on demand by the lower scheduling layer in dependence on these constraints for efficiently allocating timeslots for the data flows, and

5 serving the selected protocol data units by the lower scheduling layer.